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G. E. TRAVIS

DRAFT CONTROL FOR HEATING APPARATUS

Filed Dec. 17, 1923

FIG. 1.

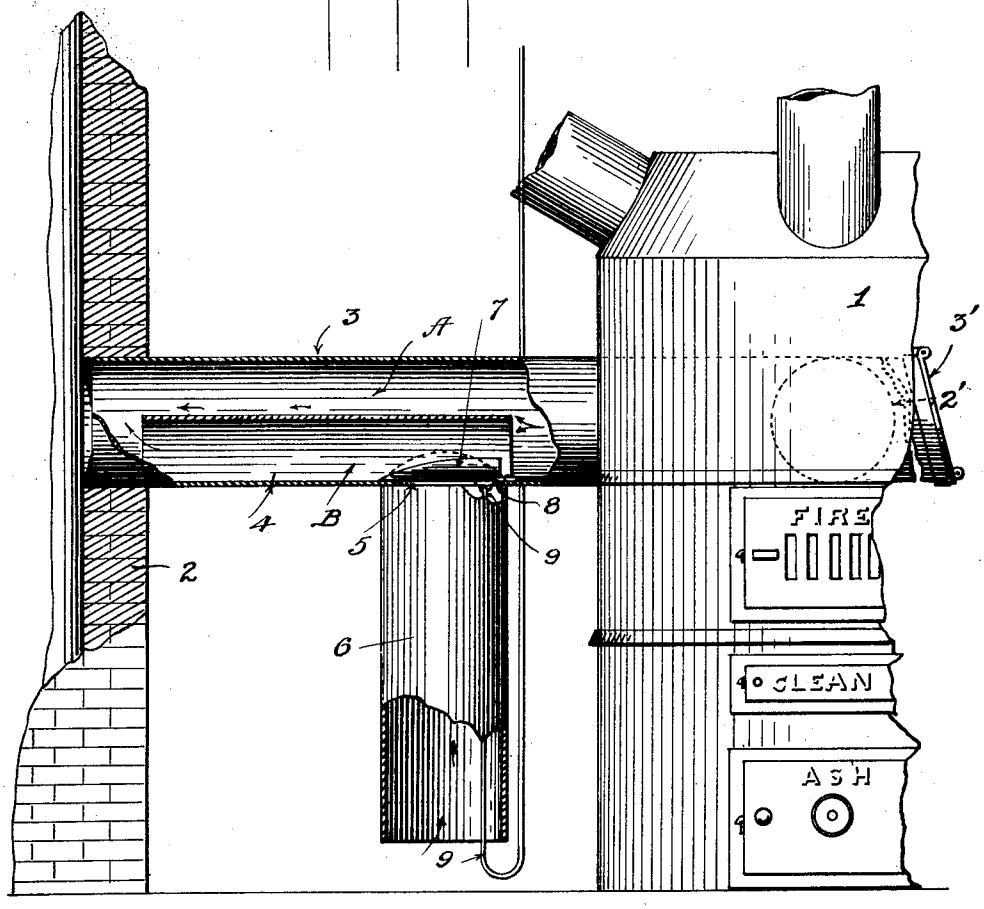


FIG. 2.

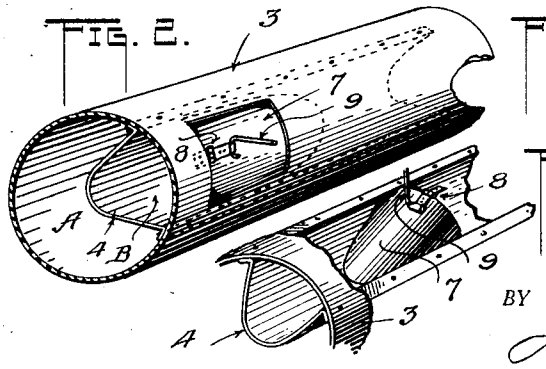


FIG. 4.

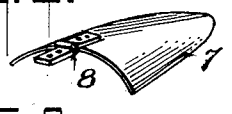


FIG. 3.

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DRAFT CONTROL FOR HEATING APPARATUS.

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This invention relates to heating apparatus, and pertains more particularly to the manner of controlling the draft in such apparatus. It pertains to a draft regulating means in direct control of the smoke passage, or passage for the escape of the products of combustion.

The object of my invention is to admit air into the path of travel of the said products of combustion at a position past which the products shall flow to the end that a better control of the heat may be made possible, and that the heat produced within the heating plant may be much better conserved and made to perform in better manner than by the present methods of control; but this will be understood in the description following, aided by the appended drawing forming part thereof which shows a preferred arrangement by which the objects sought can be realized, but wherein desired changes may be made without departing from the spirit and intent of the invention and as may be considered to fall within the scope of the appended claims.

Figure 1 is an elevation of a typical plant for heating purposes showing my invention applied thereto.

Figure 2 shows a smoke-pipe in perspective in which a secondary flue and draft damper are installed according to my invention.

Figure 3 shows in perspective a part of said smoke-pipe with parts broken away to better show the damper arrangement employed, and

Figure 4 shows a damper in perspective as employed in the particular form of smoke-pipe shown.

Before entering upon a detailed description of the invention according to the drawing it may be stated that as differing from the common method of opening a check-draft damper admitting air into the smoke-pipe to flow directly past the smoke outlet from the heating apparatus, whether furnace or other type of heater, I dispense with or make no use of the said check-draft damper and provide an inlet for air into the path of flow of the products of combustion at the desired point and am therefore able to set up an entirely different operation with attendant better results.

Any type of heating device, with any type of fuel, may be made beneficial in its operation, and the results produced, through the use of my invention, but for purposes of illustration I have shown a common form of hot air furnace designated at 1. The chimney or stack is represented at 2, and a connecting smoke-pipe is shown at 3, while 3′ denotes the old or common form of check-draft damper of which, however, I do not make use, as stated, merely illustrating it herein to make my structure more clear as well as the results obtained.

Within the pipe 3 is an arched section of the desired length whose edges are suitably secured to the pipe creating two passages A, B therein which passages may be of the same or unequal capacities as may be found to be best suited to a given heating plant. Preferably, however, the main passage or flue A is larger than the passage or flue B.

The said passage or flue B is preferably at the bottom of the pipe 3 and is open at both ends, one being spaced from the flue of the chimney or stack 2, while the other end may lie a greater or less distance from the smoke outlet 2′ of the furnace 1.

In the lower wall of the smoke-pipe 3 is an opening 5 communicating with the flue B, and suspended in suitable manner from said pipe is a depending pipe-section 6 having an open lower end, in this instance, the passage thereof communicating with said opening 5, said pipe-section being snugly fitted to said smoke-pipe so that all air entering the same must pass into said flue B.

A damper 7 is hinged at 8 to the inner wall-surface of the pipe 3 within the flue B, being provided for closing the said opening 5 in one of its positions, while in another of its positions it opens said flue to the passage of the pipe-section 6 but closes said flue between the opening 5 and the smoke-pipe 3 at the furnace end thereof. Said damper for the present purpose is in the form of a section of a cylinder, its convex side adapted to lie closely upon the lower wall of the flue B, while its edge is of such contour that when raised the damper will close said flue to the passage of the products of combustion coming from the furnace. The described form of the damper is applicable to the form of wall of the said flue B but may be readily designed for a flue of any other form as is clear.

Means is provided for actuating the damper from any convenient or desired position and in the present instance comprises a rod

9 attached pivotally to the under side of the said damper. It depends through the pipe-section 6 below which section it is bent upwardly to any desired point. It may be maintained in raised position, with the damper exposing the opening 5, by any suitable means as is evident.

In practice the damper may be allowed to close down upon the opening 5 by its own weight so that a fire may be built or added to, as the case may be, the draft being then entirely through the furnace, and practically the full area of the smoke-pipe 3.

After the fire is well started and the furnace is giving off its heat the damper 7 is raised or "opened" to expose the said opening 5 and to at the same time close the flue B at the furnace end so that the draft is then wholly through the pipe-section 6 and the flue B to the chimney 2, the drafts at the front of the furnace all being kept closed in this position of the said damper 7.

I have found that by the use of the method described much better control of the fire and the heat given off thereby is possible than by opening the common check-draft damper referred to to let the air cut across the path of the products of combustion as they pass from the furnace into the smoke-pipe. The up-draft through the pipe-section 6 has the effect of forcing air into the smoke-pipe 3 and the chimney or stack automatically checking the draft through the fire without "dampening" it as occurs in the older method wherein the fuel is held a partially dead smouldering mass. Instead of this latter result, by the use of my structure the bed of fire is kept in a bright condition, there being just enough leakage of air around the front of the furnace, with all dampers closed as stated, to aid in carrying off all of the gases.

In actual practice it is found that the coals are reduced very slowly to a coke quite unusual in a furnace, and but very slowly turning to ashes. It is believed to be clear that by driving air across the smoke outlet from the furnace and cutting off the free flow of the products of combustion, in the old way, the fire must be prevented necessarily from properly fuctioning. On the other hand, the introduction of air at a point in the smoke passage between the furnace outlet and the chimney with said passage closed at the damper 3′ the fire is not left to smoulder because of incomplete combustion. All of the gases are carried away while a bright glowing body of coals is held and the heat is retained for a much longer period of time.

A somewhat similar result is found when using the smoke-pipe 3, fitted as shown, with an ordinary stove, this section taking the place of a section of the usual stove pipe.

My invention contemplates using an opening at any point in the flow of the products of combustion and it is preferred to carry the draft through a pipe-section such as 6, or its equivalent for, while the opening alone produces a beneficial effect, the added pipe extending as low down as desired produces better results. It is found, also, that although an opening leading into the smoke line without the use of the section 4 is beneficial the addition of said section to separate the smoke passage into two flues as A, B is productive of better results.

The damper 7 is preferably placed at the opening 5 rather than elsewhere for the reason that it thus answers two purposes in that position, and it is not necessary to have a separate damper for the pipe-section 6 and the flue B.

As has already been stated the flue B at the bottom of the pipe 3, Figure 1, is terminated a distance from the chimney or stack 2. That is to say, the wall of said flue B is spaced some distance from the end of the said pipe 3 where it enters the chimney. In practice this arrangement is found to produce better results in that the air from the flue B and the gases in the said pipe come together and intermingle before passing into the chimney and therefore preventing eddying of the gases of dissimilar temperatures entering separately into said chimney.

I claim:

1. In combination, a fuel consuming heating apparatus, and a pipe connected therewith, a part disposed longitudinally within said pipe between the discharge end thereof and the said apparatus creating two separate passages within said smoke pipe both communicating with the outlet of said pipe and with the heating apparatus, there being an opening in the smoke pipe opposite the said part and communicating with one of the passages, and a damper in the passage having the opening, the same adapted to separately control the passage and the said opening.

2. In combination, a fuel consuming heating apparatus, and a horizontally directed smoke pipe connected therewith, a part disposed longitudinally with the pipe between its discharge end and said apparatus dividing the same into two separate passages both communicating with the smoke outlet and the said apparatus, there being an opening in the pipe opposite the said part, and a damper controlling the opening and the flow of air therethrough and for controlling the flow of gases through the passage with which the opening communicates.

3. In combination, a fuel consuming heating apparatus, and a smoke pipe connected therewith, a part disposed longitudinally within the pipe between the discharge end thereof and said apparatus dividing said pipe into two separate passages open throughout, there being an opening in the

wall of the pipe leading to one of the passages, and a damper disposed in the passage having the opening adapted to close the same between the said opening and the end thereof nearest the said apparatus.

4. In combination, a fuel consuming heating apparatus, and a smoke pipe connected therewith, a part disposed longitudinally within the pipe dividing the same into two separate passages open throughout toward the discharge end of the pipe and toward the said apparatus, there being an opening in the wall of the pipe leading to one of the passages, and a damper disposed in the passage having the opening adapted to separately close said opening and the end of the passage nearest the apparatus.

5. In combination, a fuel consuming heating apparatus, and a smoke pipe connected therewith, a part disposed longitudinally within the pipe dividing the same into two separate passages open throughout toward both the discharge end of the pipe and the heating apparatus, there being an opening in the wall of the pipe leading to one of the passages, a damper disposed in the passage having the opening adapted to separately close the opening and the end of the passage nearest the apparatus, and a pipe depending from the smoke pipe with which the opening communicates.

6. In combination with a fuel consuming heating apparatus, a chimney and a smoke pipe connected with and between the two, a part disposed within the pipe between the chimney and said apparatus dividing the pipe into two separate passages open throughout, said part terminating at one end remote from the flue of said chimney, there being an opening in the wall of the pipe leading into one of the passages created by said part, and a damper in the passage having such opening adapted in one position of adjustment to close said opening and in another position adapted to expose said opening and close the last named passage at a point between said opening and said apparatus.

In testimony whereof I affix my signature.

GEORGE E. TRAVIS.